ABSTRACT

An improved digital-data receiver synchronization apparatus and method is provided wherein memory devices in the receiver such as phase-lock loops are provided with composite phase-frequency detectors, mutually cross-connected comparison feedback means, or both to provide robust reception of digital data signals. The apparatus and method are preferrably utilized with synchronous architecture wherein a single master clock is used to provide frequency signals to the memory devices, and also can be used with asynchronous architecture. The apparatus and method provide fast lock-up times in moderately to severely noisy conditions and have improved tolerances to clock asymmetries.